

REMARKS

The Office Action dated March 22, 2007 has been received and carefully noted. The Examiner is thanked for indicating claims 2-6 and 12 as containing allowable subject matter and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.

The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-15 were pending and under consideration. By this Response, claims 1-4, 6, 8, 9, and 11-14 have been amended to more particularly point out and distinctly claim the subject matter of the invention. New claims 16-18 have been added to further complete the scope of protection to which Applicant is entitled. No new matter has been added. Accordingly, claims 1-18 are pending, of which claims 1, 11, and 16-18 are independent claims.

On page 2 of the Office Action, the specification was objected to because the term R_n is allegedly not defined. In response, Applicant respectfully submits that the term R_n , found on page 8, line 3 of the specification is sufficiently defined as an initially expressed priority metric, such described on, e.g., page 2, lines 12-17 of the specification. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the objection to the specification.

Claims 3, 4, and 6 were objected to in the Office Action for containing informalities. In response, Applicant has amended the claims to correct minor

typographical errors, as shown above and as suggested by the Examiner. Accordingly, the objection to claims 3, 4, and 6 is respectfully requested to be reconsidered and withdrawn, and consideration and entry of the claim amendments are respectfully requested.

On page 3 of the Office Action, claims 1, 8, 10, and 11 were rejected under 35 U.S.C. §102(e) as being anticipated by Damnjanovic (U.S. Patent No. 6,917,812 – hereinafter Damnjanovic). The Office Action contended that Damnjanovic describes all of the features of the rejected claims. In response, Applicant respectfully traverses the rejection at least for the reason that each of the presently pending claims recites subject matter which is neither disclosed nor suggested in the cited prior art.

Independent claim 1, upon which claims 2-10 are dependent, is directed to a method including scheduling data packets in time-shared channels by determining a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period. The method further includes changing the determined scheduling priority in dependence on a difference between the average preceding value and a minimum average value allocated to said user.

Independent claim 11, upon which claims 1-15 are dependent, is directed to an apparatus including a priority determination unit configured to determine a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within

a predetermined time period. The apparatus further includes a priority change unit configured to change the determined scheduling priority in dependence on a difference between the average preceding value and a minimum average value allocated to the user, wherein priority determination unit and priority change unit are configured to schedule data packets in time-shared channels.

Independent claim 16 is directed to an apparatus that parallels the apparatus of independent claim 11. Independent claim 16 is a means-plus-function claim, while independent claim 11 is a non means-plus-function claim.

Independent claim 17, which parallels method claim 1, is directed to a computer program embodied in a computer-readable medium having program codes configured to perform scheduling data packets in time-shared channels. The program is configured to perform determining a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, and changing the determined scheduling priority in dependence on a difference between the average preceding value and a minimum average value allocated to the user.

Independent claim 18 is directed to a scheduling system. The system includes a priority determination unit configured to determine a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period. The system further includes a priority change unit configured to change said

determined scheduling priority in dependence on a difference between the average preceding value and a minimum average value allocated to the user. Claim 18 recites the features in independent apparatus claim 11.

As discussed below, the present invention is directed to subject matter which is neither disclosed nor suggested in the cited prior art.

Damnjanovic generally describes, in the background part of the invention, the well known "proportional fair scheduling" that attempts, at each scheduling point, to serve the user having the largest ratio of requested service rate to average served rate, as shown in col. 1, lines 20-24, of Damnjanovic.

Based on the proportional fair scheduling approach described in Damnjanovic, an embodiment of the present invention hence differs from Damnjanovic in that:

- the determined scheduling priority is sought to be changed for an individual user in dependence on a difference between the average preceding value and a minimum average value allocated to the user, whereas Damnjanovic appears to seek to select the greatest determined scheduling metric of an user amongst a selection of multiple users.

Despite the advantages of proportional fair scheduling, Damnjanovic emphasizes that its shortcomings are such that alternative scheduling approaches are needed, as disclosed in col. 1, lines 25-26 and 48-50, of Damnjanovic. Thus, Damnjanovic describes an alternative scheduling approach to the aforementioned one, while depicting a forward link air interface scheduling technique, which evaluates user utility functions $U_i(x)$ at each scheduling decision point to determine a scheduling metric for each user.

The scheduler then schedules the user for service that has the greatest or otherwise most favorable scheduling metric, as disclosed in col. 3, lines 41-47, of Damnjanovic. Therein, an exemplary utility function is expressed as: $U_i(R_i) = \log(R_i - R_{i,\min})$, where R_i equals the measured or tracked data throughput to the i^{th} user, and $R_{i,\min}$ equals the desired minimum data throughput for that user, as described in col. 5, lines 4-17, of Damnjanovic.

In view of the above, Applicant respectfully asserts that Damnjanovic fails to describe or suggest at least scheduling data packets in time-shared channels by determining a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, as recited in Applicant's claim 1, as well as in its dependent claims 8 and 10.

Referring to independent claim 11 of the present invention, based on the alternative scheduling approach of Damnjanovic, the present invention differs from Damnjanovic in that:

- the scheduling priority is determined based on a ratio between a transmission parameter and an average preceding value of said transmission parameter, and not on the decimal logarithm of the difference between the transmission parameter and the average value of said transmission parameter; and

- the determined scheduling priority is sought to be changed for an individual user in dependence on a difference between the average preceding value and a minimum

average value allocated to the user, whereas Damnjanovic appears to seek to select the greatest determined scheduling metric of an user amongst a selection of multiple users.

A technical effect of the above-mentioned differences is to change the determined scheduling priority for a user.

Further, an objective problem to be solved by the present invention is, therefore, to change the determined scheduling priority for a user in dependence on a difference between the average preceding value and a minimum average value allocated to the user.

Applicant respectfully submits that Damnjanovic is completely silent regarding seeking to change the determined scheduling priority for a user, and then to change it in dependence on a difference between the average preceding value and a minimum average value allocated to the user. Rather, Damnjanovic appears to seek to select and schedule, amongst multiple users, the user that has the greatest or otherwise most favorable determined scheduling metric, as described in col. 3, lines 42-48 and Figure 3 of Damnjanovic.

Moreover, in contrast to the contentions made by the Office Action, Damnjanovic teaches away the juxtaposition of two different scheduling methods (i.e. the proportional fair scheduling and the forward link air interface scheduling without link between them), while specifying that due to the shortcomings of the proportional fair scheduling, alternative scheduling approaches are needed, as described col. 3, lines 42-48, of Damnjanovic.

In view of the above, Applicant respectfully asserts that Damnjanovic fails to describe or suggest at least a priority determination unit configured to determine a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, as recited in independent claim 11.

In view of the amendments and arguments set forth above in relation to the §102(e) rejection of claims 1, 8, 10, and 11 over Damnjanovic, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1, 8, 10, and 11.

On page 4 of the Office Action, dependent claim 7 was rejected under 35 U.S.C. §103(a) as being obvious over Damnjanovic in view of Wicklund (U.S. Patent No. 6,337,860 – hereinafter Wicklund). The Office Action contended that Damnjanovic describes all the claimed features except for serving users with the same scheduling priority in random order. The Office then applied Wicklund as curing the deficiency of Damnjanovic by describing making random selection if there are cells with the same priority. In response, Applicant respectfully traverses the rejection of claim 7 at least for the reasons set forth in the §102(e) rejection of its independent claim 1.

Wicklund generally describes a device for redundancy termination of cell streams incoming from two parallel switching planes. However, similar to Damnjanovic, Wicklund fails to describe or suggest at least scheduling data packets in time-shared channels by determining a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the

transmission parameter provided to the user within a predetermined time period, as recited in Applicant's claim 7. As Damnjanovic and Wicklund, combined or separately, fail to teach, disclose, or suggest all of the features of claim 7, Applicant respectfully requests the obviousness rejection of claim 7 over Damnjanovic and Wicklund be reconsidered and withdrawn.

On page 5 of the Office Action, claims 9 and 15 were rejected under 35 U.S.C. §103(a) as being obvious over Damnjanovic in view of Yi et al. (U.S. Patent Application Publication No. 2003/0101274 – hereinafter Yi). The Office Action contended that Damnjanovic describes all of the claimed features except for using the scheduling method for HSDPA in a MAC-hs unit of a node B device. In response, Applicant respectfully traverses the rejection at least for the reasons set forth above in relation to the §102(e) rejection of independent claims 1 and 11.

Yi generally describes a packet data transmission scheduling of the HSDPA system. However, similar to Damnjanovic, Yi fails to describe or suggest at least scheduling data packets in time-shared channels by determining a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, as recited in Applicant's claim 1, or a priority determination unit configured to determine a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, as

recited in independent claim 11. As Damnjanovic and Yi, combined or separately, fail to teach, disclose, or suggest all of the features recited in claim 9 and 15, which respectively depend from claims 1 and 11, Applicant respectfully requests reconsideration and withdrawal of the obviousness rejection of claim 9 and 15 over Damnjanovic and Yi.

On page 5 of the Office Action, claims 13 and 14 were rejected under 35 U.S.C. §103(a) as being obvious over Damnjanovic. The Office contended that Damnjanovic describes all of the claimed features except for disabling priority changing means by bypassing the priority changing means by switching means. The Office Action further contended that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Damnjanovic to implement switch function by setting desired minimum data throughput to zero since both proportional fair and minimum-rate scheduling are similar at the higher data rates. In response, Applicant respectfully traverses the rejection at least for the reasons set forth in the relation to the §102(e) rejection of claim 11, from which claims 13 and 14 depend.

That is, Damnjanovic fails to teach, disclose, or suggest a priority determination unit configured to determine a scheduling priority for a user based on a ratio between a transmission parameter offered to the user and an average preceding value of the transmission parameter provided to the user within a predetermined time period, as recited in independent claim 11. According, Applicant respectfully requests reconsideration and withdrawal of the obviousness rejection of claims 13 and 14 over Damnjanovic.

The arguments set forth above in relation to the pending rejections are also applicable to new independent claims 16-18.

As discussed above, Damnjanovic, Wicklund, and Yi, combined or separately, fail to teach, disclose, or suggest all of the features recited in the pending claims. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the pending rejections over Damnjanovic, Wicklund, and Yi.

In view of the above, Applicant respectfully submits that each of the claims 1-18 recites subject matter which neither disclosed nor suggested in the cited reference to Damnjanovic, Wicklund, and Yi. It is therefore respectfully requested that these pending rejections be withdrawn, and this application pass to issue with the allowance of pending claims 1-18.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Petition for Extension of Time
Additional Claim Fee Transmittal
Check No. 16769